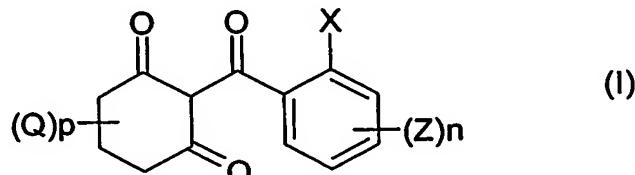


CLAIMS

1. A herbicidal composition comprising:

(i) a 2-(substituted benzoyl)-1,3-cyclohexanedione of formula (I)



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wherein X represents a halogen atom; a straight- or branched-chain alkyl or alkoxy group containing up to six carbon atoms which is optionally substituted by one or more groups -OR¹ or one or more halogen atoms; or a group selected from nitro, cyano, -CO₂R², -S(O)_mR¹, -O(CH₂)_rOR¹, -COR², -NR²R³, -SO₂NR₂R³, -CONR²R³, -CSNR²R³ and -OSO₂R₄;

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R¹ represents a straight- or branched-chain alkyl group containing up to six carbon atoms which is optionally substituted by one or more halogen atoms;

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R² and R³ each independently represents a hydrogen atom; or a straight- or branched-chain alkyl group containing up to six carbon atoms which is optionally substituted by one or more halogen atoms;

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R⁴ represents a straight-or branched-chain alkyl, alkenyl or alkynyl group containing up to six carbon atoms optionally substituted by one or more halogen atoms; or a cycloalkyl group containing from three to six carbon atoms;

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each Z independently represents halo, nitro, cyano, S(O)_mR⁵, OS(O)_mR⁵, (C₁-C₆)-alkyl, (C₁-C₆)alkoxy, (C₁-C₆)haloalkyl, (C₁-C₆)haloalkoxy, carboxy, (C₁-C₆)-alkylcarbonyloxy, (C₁-C₆)alkoxycarbonyl, (C₁-C₆)alkylcarbonyl, amino, (C₁-C₆)-alkylamino, (C₁-C₆)dialkylamino having independently the stated number of carbon atoms in each alkyl group, (C₁-C₆)alkylcarbonylamino, (C₁-C₆)-alkoxycarbonylamino, (C₁-C₆)alkylaminocarbonylamino, (C₁-C₆)-dialkylaminocarbonylamino having independently the stated number of carbon atoms in each alkyl group, (C₁-C₆)alkoxycarbonyloxy, (C₁-C₆)-alkylaminocarbonyloxy, (C₁-C₆)dialkylcarbonyloxy, phenylcarbonyl, substituted phenylcarbonyl, phenylcarbonyloxy, substituted phenylcarbonyloxy,

phenylcarbonylamino, substituted phenylcarbonylamino, phenoxy or substituted phenoxy;

R⁵ represents cyano, -COR⁶, -CO₂R⁶ or -S(O)_mR⁷;

R⁶ represents hydrogen or straight- or branched-chain alkyl group containing up to six carbon atoms;

R⁷ represents (C₁-C₆)alkyl, (C₁-C₆)haloalkyl, (C₁-C₆)cyanoalkyl, (C₃-C₈)-cycloalkyl optionally substituted with halogen, cyano or (C₁-C₄)alkyl; or phenyl optionally substituted with one to three of the same or different halogen, nitro, cyano, (C₁-C₄)haloalkyl, (C₁-C₄)alkyl, (C₁-C₄)alkoxy or -S(O)_mR⁸;

R⁸ represents (C₁-C₄)alkyl;

each Q independently represents (C₁-C₄)alkyl or -CO₂R⁹ wherein R⁹ is (C₁-C₄)-alkyl;

m is zero, one or two;

n is zero or an integer from one to four;

r is one, two or three; and

p is zero or an integer from one to six; and

(ii) an organic phosphate, phosphonate or phosphinate adjuvant at a concentration of less than 0.5% v/v when added to a spray tank as a tank mix additive or when co-formulated with a herbicide to produce a spray tank concentration of less than 0.5% v/v.

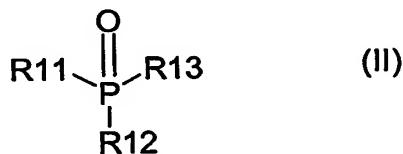
2. A herbicidal composition according to claim 1, wherein X is chloro, bromo, nitro, cyano, C₁-C₄ alkyl, -CF₃, -S(O)_mR¹, or -OR¹.
3. A herbicidal composition according to any one or claims 1 or 2, wherein each Z is independently chloro, bromo, nitro, cyano, C₁-C₄ alkyl, -CF₃, -OR¹, -OS(O)_mR⁵ or -S(O)_mR⁵.
4. A herbicidal composition according to any one of claims 1 to 3, wherein n is one or two.
5. A herbicidal composition according to any one of claims 1 to 4, wherein p is zero.

6. A herbicidal composition according to any one of claims 1 to 5, wherein the compound of formula (I) is selected from the group consisting of 2-(2'-nitro-4'-methylsulphonylbenzoyl)-1,3-cyclohexanedione, 2-(2'-nitro-4'-methylsulphonyloxy benzoyl)-1,3-cyclohexanedione, 2-(2'-chloro-4'-methylsulphonylbenzoyl)-1,3-cyclohexanedione, 4,4-dimethyl-2-(4-methanesulphonyl-2-nitrobenzoyl)-1,3-cyclohexanedione, 2-(2-chloro-3-ethoxy-4-methanesulphonylbenzoyl)-5-methyl-1,3-cyclohexanedione and 2-(2-chloro-3-ethoxy-4-ethanesulphonylbenzoyl)-5-methyl-1,3-cyclohexanedione.

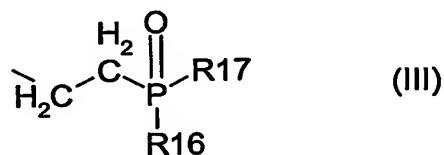
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7. A herbicidal composition according to any one of claims 1 to 6, wherein the phosphate, phosphonate or phosphinate adjuvant is a compound of formula II

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wherein R^{11} is an alkoxy group containing from 4 to 20 carbon atoms or a group $-\text{[OCH}_2\text{CHR}^{14}]_t\text{-OR}^{15}$ wherein R^{14} is hydrogen, methyl or ethyl, t is from 0 to 50 and R^{15} is hydrogen or an alkyl group containing from 1 to 20 carbon atoms; and R^{12} and R^{13} are independently (i) an alkyl or alkenyl group containing from 4 to 20 carbon atoms; (ii) optionally substituted phenyl; (iii) an alkoxy group containing from 4 to 20 carbon atoms or (iv) a group $-\text{[OCH}_2\text{CHR}^{14}]_t\text{-OR}^{15}$ as herein defined; or (v) a group of formula (III)



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wherein R^{16} is an alkoxy group containing from 4 to 20 carbon atoms or a group $-\text{[OCH}_2\text{CHR}^{14}]_t\text{-OR}^{15}$ as herein defined and R^{17} is an alkyl group containing from 4 to 20 carbon atoms, optionally substituted phenyl, an alkoxy group containing from 4 to 20 carbon atoms or a group $-\text{[OCH}_2\text{CHR}^{14}]_t\text{-OR}^{15}$ as herein defined; and wherein t is from 0 to ten.

25 8. A herbicidal composition according to claim 7, wherein the compound of formula (II) is a phosphate in which R^{11} , R^{12} and R^{13} are all independently alkoxy groups.

9. A herbicidal composition according to claim 7, wherein the compound of formula (II) is a phosphonate in which R¹¹ and R¹² are both independently alkoxy groups and R¹³ is an alkyl, alkenyl or optionally substituted phenyl group.
10. A herbicidal composition according to claim 7, wherein the compound of formula (II) is a phosphinate in which R¹¹ is an alkoxy group and R¹² and R¹³ are both independently an alkyl, alkenyl or optionally substituted phenyl group.
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11. A process for the control of weeds, said process comprising applying to the locus of the weeds a herbicidally effective amount of a composition as claimed in any one of claims 1 to 10.